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## Does Friendship Quality Moderate the Association Between Social Anxiety and Loneliness in College Students?

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Does Friendship Quality Moderate the Association Between Social Anxiety and  
Loneliness in College Students?

Gavriel Boniuk

## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

**Abstract**

There is a strong positive association between social anxiety and loneliness (Maes et al., 2019). This relationship appears to be weaker the higher the quality of children's friendships (Erath et al., 2010). While the moderational relationship has been demonstrated among middle school children, it is not known whether it extends into the college population. There are important developmental differences between adolescents and college students. For example, the increased reliance on friendships that is typical during college may result in an increase in the protective nature of friendship quality in the relationship between social anxiety and loneliness (Danneel et al., 2019; Heinrich & Gullone, 2006). These differences suggest that the relationships between friendship quality, social anxiety, and loneliness should be examined in the older group. I hypothesized that the association between social anxiety and loneliness would be moderated by friendship quality such that the higher the quality of friendships, the *weaker* the association between social anxiety and loneliness in the college population. The results revealed a negative correlation between loneliness and friendship quality, and a positive correlation between loneliness and social anxiety, as well as friendship quality and social anxiety. However, the relationship between social anxiety and loneliness was not moderated by friendship quality. These findings are important to consider in the effort to understand social anxiety and loneliness in college. The examination of other variables is necessary in the association of social anxiety and loneliness to discover potential protective factors.

## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

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## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

### **Does Friendship Quality Moderate Social Anxiety and Loneliness?**

Social anxiety disorder has a lifetime prevalence between 8.4 and 15% worldwide, making it one of the most common psychological disorders (Crome et al., 2014; Ohayon & Schatzberg, 2010). The onset of the disorder usually occurs in childhood or adolescence and can be a longstanding issue if left untreated (Ruscio et al., 2007).

Social anxiety can be severe and debilitating. Individuals with significant social anxiety often have difficulty meeting new people, engaging in conversations, or being observed while eating. This disorder is associated with fear and inhibition, and it is often hindering and burdensome in social, occupational, and other areas of functioning. Individuals who have social anxiety disorder often struggle to adapt to new social environments, advocate for themselves at work, and pursue other goals involving social engagement (Ruscio et al., 2007).

The presence of social anxiety is associated with other problems. High levels of social anxiety are associated with lower levels of education, unemployment, economic problems, lower income, poorer overall health (Acarturk et al., 2008), poorer mental health due to comorbid mental disorders (Buist-Bouwman et al., 2006), lower self-efficacy (Dahl & Dahl, 2010), insomnia, somatic diseases (Druss et al., 2008), and alcohol problems (Buckner, Schmidt, & Eggleston, 2009; Morris, Stewart, & Ham, 2005).

Several behavioral and cognitive mechanisms are involved in the development and maintenance of social anxiety. The main behavioral mechanism that maintains social anxiety is the avoidance of anxiety-inducing situations. Avoidance behavior is negatively reinforced through the relief that it provides from the discomfort of anxiety, thereby increasing behavior that is avoidant (Mowrer, 1956; Teo, Lerrigo, & Rogers, 2013). Cognitively, those with social anxiety often develop maladaptive thoughts and cognitive distortions about their anxiety (Beck,

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1963). Self-criticisms of social skills may lead to catastrophized thoughts of social ineptitude or overgeneralization of one social deficit to other social deficits. For example, criticism of one's ability to tell stories resulting in the thought, "My conversational abilities are all terrible" is an overgeneralization of the criticism. The same criticism leading to the thought, "I am the worst storyteller in the world" is the cognitive distortion of catastrophizing. The most common cognitive distortions for those with social anxiety are jumping to conclusions, personalization, mind reading, and overgeneralization (Kaplan, 2017). Actual social skills deficits also contribute to the cognitive distortions that develop in social anxiety (Baker & Edelman, 2002). These deficits are more apparent in reciprocal conversations than in speeches, and those with social anxiety overestimate their deficits in both reciprocal conversations and speeches (Voncken & Bögels, 2008). Lastly, those with social anxiety experience an activation of the amygdala's fear response to neutral social stimuli (Hattingh et al., 2012). Overactivation of the amygdala's fear response to neutral social stimuli may condition those with social anxiety to increase avoidant behavior through negative reinforcement (Skinner, 1938).

One particularly distressing correlate of social anxiety is loneliness. Socially anxious children report being lonelier than their non-socially anxious peers (Weeks, Coplan, & Kingsbury, 2009). Loneliness is associated with other mental health problems including depression (Vanhalst, Luyckx, & Goossens, 2014), substance use (Cacioppo et al., 2015), suicidal ideation, low self-esteem, victimization (Heinrich & Gullone, 2006), sleep disturbances, medical issues, and premature mortality (Cacioppo et al., 2002).

Loneliness can be thought of as an undesirable emotional experience and is divided into three separate dimensions: intimate, relational, and collective loneliness (Hawkley, Gu, Luo, & Cacioppo, 2012). Intimate loneliness is a dissatisfaction relating to romantic relationships,

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relational loneliness occurs with a dissatisfaction regarding quality friendships, and collective loneliness relates to a dissatisfaction relating to connection through identification with others in groups larger than 150 people (Dunbar, 2014; Hawkley, Gu, Luo, & Cacioppo, 2012). Even after satisfying one dimension of loneliness, lonely feelings can still be experienced due to deficits in the other dimensions. For example, a person may feel lonely despite reporting having “best friends” (Williams & Solano, 1983).

Loneliness in college students has recently seen a rise from previous reports of 37% of adolescents reporting loneliness in 2013 (Vanhalst et al., 2013). In 2020, 56.7% of a sample of college students reported moderate levels of loneliness, and 23.6% reported severe levels of loneliness compared to previous findings of 2.5% to 18.4% reporting moderate to severe levels of loneliness in 2018 and 2020 (Diehl et al., 2018; Singh et al., 2020; Hysing et al., 2020; Labrague, De Los Santos, & Falguera, 2021). Although much of the recent rise in loneliness has been related to isolation during the COVID-19 pandemic, multiple factors may be involved in the changes seen in the college population (Loades et al., 2020). This high prevalence in college students may be partially explained by the association between shyness and low self-esteem with loneliness. During college, shyness and low self-esteem may become more closely associated with loneliness than in previous stages of life because there is often less support from caregivers when college students move away from home. Students often shift from seeking guidance and aid from caregivers to seeking these from friends when they begin college (Zhao, Kong, & Wang, 2012). However, understanding the rise of loneliness from 2013 to 2020 requires further research.

Several behavioral and cognitive mechanisms are involved in the development and maintenance of loneliness. Loneliness is theorized to result from self-defeating attributions, low

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self-esteem, anxiety, various personality traits, and genetic vulnerabilities (Qualter et al., 2015). For example, those who feel lonely may develop the behavioral mechanism of avoidance of social situations to circumvent the positive punishment of rejection. This avoidance would reduce the behavior of social interaction (Skinner, 1938). Those who feel lonely may develop affective mechanisms of depressed mood and resentment. Depressed mood and resentment could then result in a decreased social desirability in the eyes of others (Vanhalst, Luyckx, & Goossens, 2014). Cognitive mechanisms may present as low self-esteem or generalization of social rejection and cause an individual to develop maladaptive schemas (Beck, 1963).

Quality friendships can be protective factors in the relational components of both social anxiety and loneliness. Friendship quality is defined as the characteristics of the relationship between individuals. In high-quality friendships, mutual bonds between two individuals are based on companionship, conflict, help, security, and closeness (Hoffman et al., 2021). The friendship between individuals is complex and varies for each dyad and circumstance. Some friendships are described as closer than others, with many individuals claiming someone as their “best friend” or “closest friend.” On average, cortisol levels are significantly lower and global self-worth is significantly higher when a best friend is present than when a best friend is not present (Adams, Santo, & Bukowski, 2011). Furthermore, the bond between two individuals can mitigate the effects of negative experiences (Adams et al., 2011). This may be a result of the empathic bond between the individuals and the comfort that empathy brings, especially when a negative experience demands consolation. Empathic bonds between best friends can provide security, reassurance, and relief from pain or stress (Adams et al., 2011).

Humans are social beings, and the human brain’s social development is somewhat dependent on social experiences. Mirror neurons allow an individual to experience the bodily



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experience of another as if they were the other individual (Elliot et al., 2011). To proliferate, mirror neurons must be activated through interactions with others (Elliott, Bohart, Watson, & Greenberg, 2011). Mirror neurons are crucial in the development of empathy, and they are activated more powerfully in response to the experiences of individuals with whom there is a particularly close bond. For example, parents and close friends elicit stronger responses from children from even a very young age, while the converse is also true with babies eliciting stronger responses from their biological parents than from strangers (Swain, Konrath, Dayton, Finegood, & Ho, 2013).

Social anxiety alone may not explain avoidant emotion regulation strategies in the college population. Emotion regulation strategies help college students navigate times of high negative affect (Doorley & Kashdan, 2021). Avoidant emotion regulation strategies, such as expressive depression, have been associated with lower peer acceptance in comparison to engagement-oriented emotion regulation strategies, such as cognitive reappraisal (Chang, 2005; Daros et al., 2019). Socially anxious college students were nearly equally likely to use either of these strategies during periods of high negative affect as their non-socially anxious peers. This seems to indicate that social anxiety alone is not a significant factor associated with college students avoiding social interactions (Daros et al., 2019). Unfortunately, research up until this point had not considered the impact of the quality of friendship in this relationship. Researchers have proposed that the quality of friendship between socially anxious college students and others may impact the use of avoidant versus engagement-oriented emotion regulation strategies (Daros et al., 2019). To further explore the emotion regulation strategies used by socially anxious college students, the relationship between social anxiety and friendship quality was examined.

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Vygotsky's Sociocultural Theory explains how an individual learns from others in their environment. Vygotsky posits that there is a zone of development that determines an individual's ability to learn. The zone of proximal development is comprised of three categories including, that which a person can learn on their own, that which a person can learn with assistance, and that which a person cannot learn even with assistance (Vygotsky, 1978). Learning in the zone of proximal development depends on the presence of someone who has the tools and knowledge necessary to guide the learner, scaffolding, and social interactions providing the learner with opportunities to work on their skills and abilities. Much of learning occurs through a process called "scaffolding," and in this process, an individual learns by adding progressive layers to knowledge bases through the guidance of the "more knowledgeable other." The "more knowledgeable other" redirects the learner, models behaviors, provides opportunities for independent learning, encourages the use of prior knowledge, and facilitates collaborative efforts. Although scaffolding was not originally proposed by Vygotsky, its addition helps to provide a framework through which individuals learn (Shvarts & Bakker, 2019). Social interactions between peers can have noteworthy impacts on learning and development. Peer mentorship has been shown to reinforce skill-building and self-regulation activities, increase engagement in individual and group activities, and provide social support for achieving goals (Petosa & Smith, 2014).

In the case of socially anxious college students, sociocultural theory explains how social anxiety develops, becomes a more challenging issue in college, leads to loneliness, and can be mitigated by higher-quality friendships. Social anxiety, which is often characterized by avoidance of social situations and physiological symptoms of stress, is theorized to result from learned maladaptive behaviors (Wong & Rapee, 2015). Through sociocultural theory, a socially

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anxious college student learns maladaptive coping mechanisms and does not acquire various social skills and confidence in social situations. These issues can become more pronounced during college because the socially anxious student who moves away from home must adapt to a new culture without parents, who are often the “more knowledgeable others” (Zhao, Kong, & Wang, 2012). The added stressors of college and moving away from home lead to the loneliness experienced by the college student because the deficits in social skills and coping mechanisms are highlighted by an increase in feelings of anxiety (Moeller & Seehuus, 2019). However, a socially anxious student could enter a zone of proximal development by learning social skills and coping mechanisms from more socially capable friends (Bandura, 1977). Loneliness, which leads to many additional challenges, may also be relieved by the support that a socially anxious student receives from a high-quality friendship (Adams et al., 2011; Heinrich & Gullone, 2006).

Anxious college students may be reliant on peer friendships when managing the challenges they face in college. Close mutual friendships moderate the association between social anxiety and psychosocial maladjustment for middle schoolers (Erath et al., 2010). In college, students are exposed to the added challenges of independence and continuing education. As a result, many students report feeling lonely (Moeller & Seehuus, 2019). During this time, college students who move away from their homes become more reliant on peer friendships (Danneel et al., 2019; Heinrich & Gullone, 2006). Many students benefit from the protective factor of the high-quality friendships that develop in the college setting (Adams et al., 2011; Cacioppo et al., 2015). Higher-quality friendships are also related to enhanced social skills, which is related to higher self-confidence (Moeller & Seehuus, 2019).

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Friendship quality and loneliness are separate, but related, constructs. Friendship quality is the actual closeness of one person to another. Quality friendships often involve disclosure and empathetic connections (Elliot et al., 2011; Corsano, 2017). Loneliness is the emotion experienced by an individual regarding their relationships. Loneliness may be based in reality, but loneliness may also be related to false beliefs about the quality of friendships or external factors such as depressed mood and substance use (Anderson & Harvey 1988; Cacioppo et al., 2002; Heinrich & Gullone, 2006; Rich & Scovel, 1987). Individuals may feel lonely despite having quality friendships. Alternatively, individuals may not feel lonely despite a lack of quality friendships (Williams & Solano, 1983; Matook, Cummings, & Bala, 2015).

Only one study in college aged students has examined the relationships between shyness, loneliness, and interpersonal relations previously. Participants in the study were 361 Chinese university freshmen with a mean age of 18.57. Constructs were measured in a cross-lagged design using a Chinese adaptation of the Cheek and Buss Shyness Scale, a Chinese adaptation of the Cheek and Russell Loneliness Scale, and a ten-item questionnaire measuring the quantity and quality of interpersonal relationships (Russell et al., 1978; Cheek & Buss, 1981; Wang, 1995; Fang, Wo and Lin 2005; Wang, Wang, Han, Gong & Gao, 2009). The results show a positive association between shyness and loneliness in college students, a negative association between interpersonal relations and loneliness, and a negative association between interpersonal relations and shyness (Tian et al., 2019). These results help to establish the relationships between shyness, loneliness, and interpersonal relations; however, some important questions remain. A moderation analysis was not conducted, so it was not clear that the association between social anxiety and loneliness would be moderated by friendship quality. Understanding this association could have identified high-quality friendships as a protective factor against loneliness in the socially anxious

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population. Additionally, shyness and social anxiety are fundamentally different in their severity; social anxiety is related to more symptomatology, more functional impairment, and a lower quality of life when compared with shyness (Heiser et al., 2008).

Previous research found a moderational impact of close mutual friendships in the association between social anxiety and psychosocial maladjustment among adolescents (Erath et al., 2010). However, there are important developmental differences between adolescents and college students, such that the relationships between friendship quality, social anxiety, and loneliness should be examined in the older group (Danneel et al., 2019; Heinrich & Gullone, 2006). The increased reliance on friendships that is typical during college may result in an increase in the protective nature of friendship quality in the relationship between social anxiety and loneliness (Adams et al., 2011; Cacioppo et al., 2015). Loneliness is a belief that being connected would relieve the negative impact of not being connected with an individual or group (Ostrov & Offer, 1978). While middle school and high school students often receive support from parents, students emphasize their reliance on peer support in college (Heinrich & Gullone, 2006). The loneliness experienced by college students often relates to a desire for a connection with other students (Danneel et al., 2019). College students also face challenges in independence when they move away from home, structure their schedules, and take challenging courses (Zhao, Kong, & Wang, 2012; Danneel et al., 2019;). The added stress associated with increased independence is related to an increase in the prevalence of social anxiety and loneliness seen in college students (Moeller & Seehuus, 2019). This spike in social anxiety and loneliness in college may suggest a susceptibility to these challenges related to an increased emphasis on independence. Additionally, while previous research has demonstrated relationships between

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shyness, loneliness, and interpersonal relations in college students, a moderational relationship was not examined (Heiser et al., 2008).

The present study sought to examine whether the association between social anxiety and loneliness would be moderated by friendship quality such that the lower the quality of friendships, the *stronger* the association between social anxiety and loneliness. Further research was also necessary to examine the relationship between social anxiety specifically, as social anxiety is related to more symptomatology, more functional impairment, and a lower quality of life than shyness (Heiser et al., 2008). Shyness has been conceptualized as a personality trait, that is present from birth and consistent throughout the lifespan. Social anxiety is more susceptible to change with treatment than shyness. Additionally, social anxiety results from a learned inhibition or fear based on experience (Wong & Rapee, 2015). Shyness can occur independently of anxiety. Shyness may relate to a similar avoidance of social interactions seen in social anxiety, but the avoidance in shyness may be ego-syntonic while social anxiety is typically ego-dystonic (Heiser et al., 2008). The present study alters the variables used in previous research, to incorporate social anxiety, instead of shyness, and investigates the moderational relationship between social anxiety and loneliness. Research that has found a moderational impact of close mutual friendships in the association between social anxiety and psychosocial maladjustment among adolescents, did not account for the increase in peer reliance in college. Therefore, the present study examined this relationship in a college population.

I hypothesized that social anxiety severity and loneliness severity would be positively correlated. Social anxiety and loneliness have been associated in previous research (Weeks, Coplan, & Kingsbury, 2009).

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I hypothesized that the positive correlation between social anxiety severity and loneliness severity would be moderated by friendship quality, such that the weaker the friendship quality, the stronger the association between social anxiety and loneliness would be. I expected this moderation to occur because college students may rely on their friends during college to alleviate the challenge of loneliness. High-quality friendships have been associated with positive social and emotional changes (Adams et al., 2011).

### Method

#### Participants

The participants of this study were recruited through the Amazon Mechanical Turk research participant recruitment system. Participants participated from colleges throughout the United States. The study was advertised as a study of college students' social experience of school. The following inclusion and exclusion criteria were used to determine appropriate study participants:

#### Table 1

##### *Demographic Table*

Participants (total	n
133 ages 18-26)	
Mean age 23.36	
Male	99
Female	33
Black	1
Asian	1

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Native American/ Alaska Native	6
White	124
<u>Hispanic/Latino/a</u>	<u>11</u>

Table 1 depicts the results of the demographics. Participants were 132 undergraduate students between the ages of 18-26 with a mean age of 23.36. Younger participants were excluded because they may have received more support from parents in comparison to those ages 18-26, and older participants were excluded because they may have had time to adjust to their increased independence. 33 of the participants were female and 99 were male. One participant identified as Black or African American, one identified as Asian, six identified as Native American or Alaska Native, and 124 identified as white. 11 of the participants identified as Hispanic/Latino/a. Only undergraduate students who had been enrolled for at least two weeks were included, as this allowed students some time to begin encountering the challenges of college. Those in treatment for social anxiety were excluded because they could have confounded the data collected for this study. Participants who were married were excluded due to the additional support they received from their spouses. Lastly, participants living with their parents were excluded because they may have been less reliant on friendships.

### **Design**

The research design was cross-sectional and correlational. Surveys were sent out to participants through Qualtrics, and they were required to complete measures of social anxiety, quality of friendships, loneliness, and a sociodemographic questionnaire. The independent variable was social anxiety, the moderating variable was friendship quality, and the dependent variable was loneliness. A regression analysis was used to analyze the data.



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### Procedure

This study was granted approval by the LIU Institutional Review Board (IRB). Each participant signed consent forms, which allowed them to participate. Participants were recruited through word-of-mouth and Amazon Mechanical Turk's advertising board. Data collection took place online through an electronic survey. Participants were asked to assess their friendship quality, social anxiety, and loneliness. Data collection for each participant took place over approximately one hour over a single session. Participants were given \$3 after all the assessments were completed. Recruitment was completed through electronic formats and the Qualtrix data collection system. Qualtrix screened for robotic responses through their bot detection feature, and responses from robots were excluded from the study. Responses that were recorded at speeds that were unlikely to have been achieved by human input were excluded. Additionally, the bot detection feature flagged and removed responses that came from the same source or had copied and pasted data.

### Measures

**Sociodemographic Questionnaire.** The participants were given a sociodemographic self-report questionnaire that assessed information about the participants' age, gender, ethnicity, and estimated total family income. Age was measured in terms of years. The options for gender were *Male, Female, and Gender Non-Binary*. The option responses for ethnicity were *White, Black/African American, Asian, Native American, Native Hawaiian/Pacific Islander and Mixed/Other*. The questionnaire asked participants if they were Hispanic/Latino with options of *Yes* or *No*. Socioeconomic status was divided into *below \$40,000, between \$40,000-\$150,000, or greater than \$150,000* based on total family income and indicating lower class, middle class, and upper class, respectively. The questionnaire took about 15 minutes to complete.

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**Friendship Quality.** Friendship quality was assessed using the McGill Friendship Questionnaire-Respondents' Affection (MFQ-RA; Mendelson & Aboud, 1999). The measure required about 15 minutes to complete. The test consists of 16 items that were self-reported by the participant on a Likert scale of 9 anchor points ranging from -4 to 4 with -4 representing a response of "very much disagree" and 4 representing a response of "very much agree." The scores were summed in groups for three quality subjects: "Positive Feelings," "Satisfaction," and "Evaluation." The total score of all the quality subjects can range from -64 to 64. An example of an item rated on the Likert scale was, "I am happy with my friendship with \_\_\_\_." The scales of the MFQ-RA have high reliability, which was indicated by its high internal consistency. The Cronbach's  $\alpha$  was .96 for the positive feelings subscale, .92 for the satisfaction subscale, and .90 for the evaluation subscale. The MFQ-RA has high discriminant validity and construct validity (Mendelson & Aboud, 1999).

**Social Anxiety.** Social anxiety was measured by the criteria listed in the DSM 5 through the Liebowitz Social Anxiety Scale (LSAS-SR; Rytwinski et al., 2009). The LSAS-SR had 24 items and was rated on a 4-point Likert scale that measured fear and avoidance of social situations over the past week before completing the measure. Participants rated each item based on both fear (0 = none to 3 = severe) and avoidance (0 = never to 3 = usually) with 11 of the items related to social interaction and 13 of the items related to public performance. Total scores ranged from 0 to 144 with scores of 50-65 representing moderate social anxiety, 65-80 representing marked social anxiety, 80-95 representing severe social anxiety, and scores over 95 representing very severe social anxiety. An example of an item rated on the Likert scale was, "Speaking up at a meeting." The measure showed adequate internal consistency ( $\alpha = 0.96$ ) as well as an acceptable association between items and total score (0.38-0.72) (Dos Santos et al.,

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2013). The LSAS-SR had a high face validity, convergent validity, and discriminant validity (Safren et al., 1999; Rytwinski et al., 2009).

**Loneliness.** Loneliness was measured using the UCLA Loneliness Scale-Revised (UCLALS-R; Vassar & Crosby, 2008). This scale was used to measure the severity of loneliness in the participants. The UCLALS-R had 20 items rated on a 4-point Likert scale ranging from 1 (Never) to 4 (Often). Ten of the questions were positively worded and ten were negatively worded to prevent response biases. The total score ranged from 10 to 40 with higher scores representing more severe loneliness. An example of an item rated on the Likert scale was, “People are around me but not with me.” The UCLALS-R is highly reliable, with an internal consistency coefficient ranging from  $\alpha = .89$  to  $.94$  and test-retest reliability of  $r = .73$  (Vassar & Crosby, 2008). There were also significant associations with other measures of loneliness indicating significant convergent validity (Vassar & Crosby, 2008).

### Data Analysis

I used a regression analysis to test the relationship between the independent variables of friendship quality and social anxiety on the feelings of loneliness, which was the dependent variable. The hypothesis predicted a positive association between all three of the variables. A moderation model was tested in which I hypothesized that the association between social anxiety and loneliness would be moderated by friendship quality such that the lower the quality of friendships, the *stronger* the association between social anxiety and loneliness. The data was analyzed using a hierarchical regression analysis performed at an alpha of  $p < 0.05$ . Each of these variables was rated on continuous Likert scales. Social anxiety was the predictor, and friendship quality was the moderator.

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## Results

**Table 2**  
*Summary Statistics Table for loneliness, social anxiety, and friendship quality*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE<sub>M</sub></i>	Min	Max	Skewness	Kurtosis
Loneliness	49.30	6.29	132	0.55	24.00	71.00	-0.68	2.26
Social anxiety	91.73	25.95	132	2.26	13.00	142.00	-0.72	0.55
Friendship quality	112.76	21.49	132	1.87	37.00	142.00	-1.17	0.94

Table 2 summarizes the statistics of mean and standard deviation of the results.

Loneliness had a mean of  $M = 49.30$  and  $SD = 6.29$ , social anxiety had a mean of  $M = 91.73$  and  $SD = 25.95$ , and friendship quality had a mean of  $M = 112.76$  and  $SD = 21.49$ .

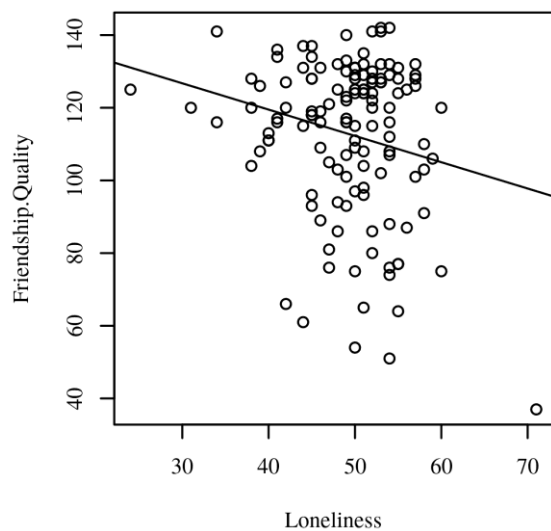
A Pearson correlation analysis was conducted among measures of loneliness, friendship quality, and social anxiety. As seen in Figure 1, a statistically significant negative correlation was observed between loneliness and friendship quality, ( $r = -.21, p = .015, 95\% \text{ CI} = [-.37, -.04]$ ). This correlation corresponded with a small effect size. As seen in Figure 2, a statistically significant positive correlation was observed between loneliness and social anxiety, ( $r = .49, p < .001, 95.00\% \text{ CI} = [.35, .61]$ ), indicating a moderate effect size. As seen in Figure 3, a statistically significant positive correlation was observed between friendship quality and social anxiety, ( $r = .24, p = .010, 95.00\% \text{ CI} = [.08, .40]$ ) indicating a small effect size.

The assumptions of normality and homoscedasticity were examined and yielded acceptable results. Outliers were also examined with none being significant. The results for multicollinearity suggested that the factors were all significantly multicollinear. Figure 1-Figure 3 present the scatterplots of the correlations. The figures appeared linear, demonstrating that a correlation was an appropriate measure.

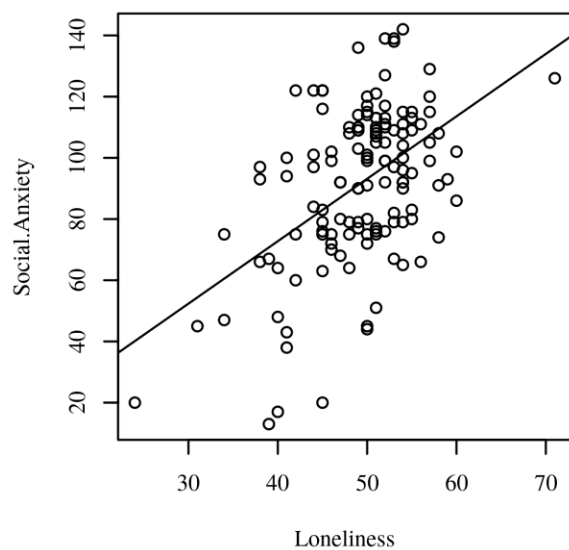
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**Figure 1**

*Scatterplot with the regression line added for loneliness and friendship quality*

**Figure 2**

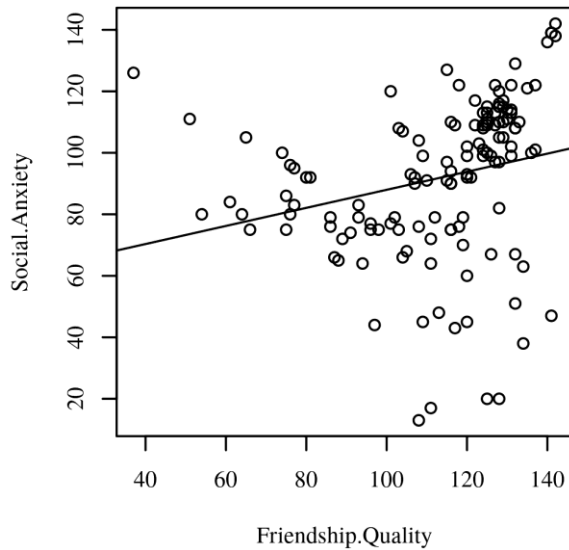
*Scatterplot with the regression line added for loneliness and social anxiety*



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**Figure 3**

*Scatterplots with the regression line added for friendship quality and social anxiety*



A linear regression analysis was conducted to assess whether friendship quality and social anxiety significantly predicted loneliness. The best fitting linear equation was as follows:

$$\text{loneliness} = 40.09 + 0.23 * \text{social anxiety} - 0.04 * \text{friendship quality} - 0.0007 * \text{social}$$

*anxiety:friendship quality.*

**Table 3**

*Results for Linear Regression with social anxiety, friendship quality, and social anxiety:friendship quality predicting Loneliness*

Variable	<i>B</i>	<i>SE</i>	95.00% CI	$\beta$	<i>t</i>	<i>p</i>
(Intercept)	40.09	11.03	[18.26, 61.92]	0.00	3.63	< .001
Social Anxiety	0.23	0.12	[-0.004, 0.46]	0.93	1.94	.054
Friendship quality	-0.04	0.09	[-0.22, 0.15]	-0.12	-0.38	.706
Social anxiety:friendship quality	-0.0007	0.0010	[-0.003, 0.001]	-0.47	-0.74	.460

*Note.* Results:  $F(3,128) = 24.46, p < .001, R^2 = .36$

Unstandardized Regression Equation:  $\text{loneliness} = 40.09 + 0.23 * \text{social anxiety} - 0.04 * \text{friendship quality} - 0.0007 * \text{social anxiety:friendship quality}$

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The results of the linear regression model were statistically significant,  $F(3,128) = 24.46$ ,  $p < .001$ ,  $R^2 = .36$ , indicating that 36.44% of the variance in loneliness was explainable by social anxiety and friendship quality. Controlling for friendship quality, social anxiety did not significantly predict loneliness,  $B = 0.23$ ,  $t(128) = 1.94$ ,  $p = .054$ . Based on this sample, controlling for loneliness, a one-unit increase in social anxiety did not significantly predict a change in loneliness. Controlling for social anxiety, friendship quality did not significantly predict loneliness,  $B = -0.04$ ,  $t(128) = -0.38$ ,  $p = .706$ . Based on this sample, controlling for social anxiety, a one-unit increase in friendship quality did significantly predict loneliness.

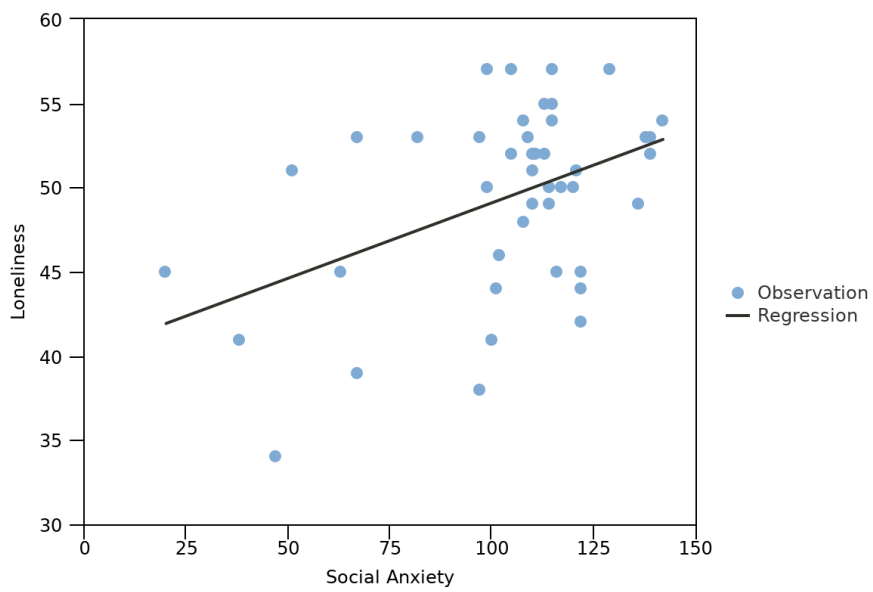
The interaction between social anxiety and friendship quality did not significantly predict loneliness,  $B = -0.0007$ ,  $t(128) = -0.74$ ,  $p = .460$ . Based on this sample, a one-unit increase in social anxiety did not significantly predict the strength of the relationship between X and Y of loneliness on friendship quality. The best fitting linear equation was as follows: loneliness =  $48.04 - 0.10 * \text{friendship quality} + 0.14 * \text{social anxiety}$ .

Figures 4-6 presented three correlations conducted between social anxiety and loneliness divided into low, medium, and high friendship quality ratings. The figures did not clearly show a difference in the slope of the regression line. This further demonstrates that the correlation between social anxiety and loneliness did not change based on the quality of friendship.

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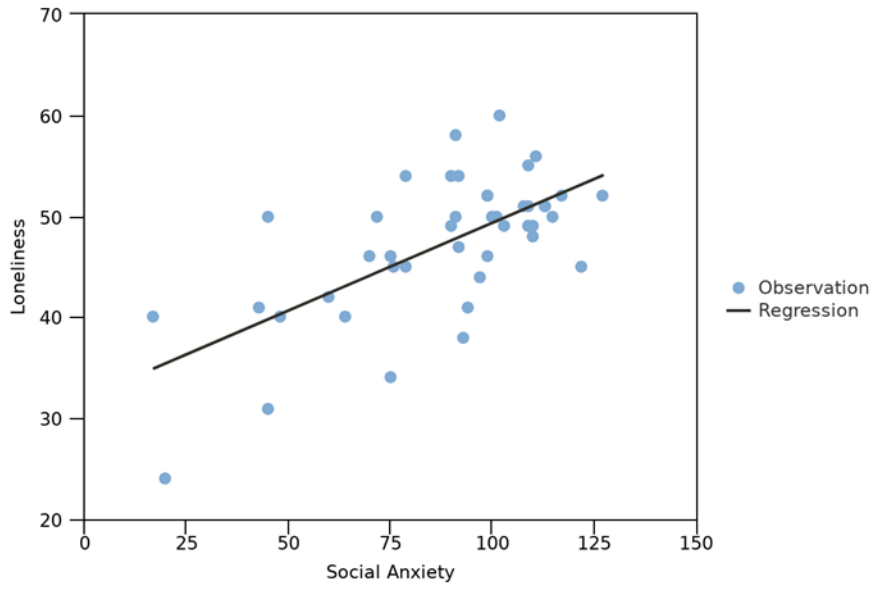
**Figure 4**

*Scatterplot of social anxiety and loneliness filtered by friendship quality for those scoring in the top third of friendship quality*



**Figure 5**

*Scatterplot of social anxiety and loneliness filtered by friendship quality for those scoring in the middle third of friendship quality*

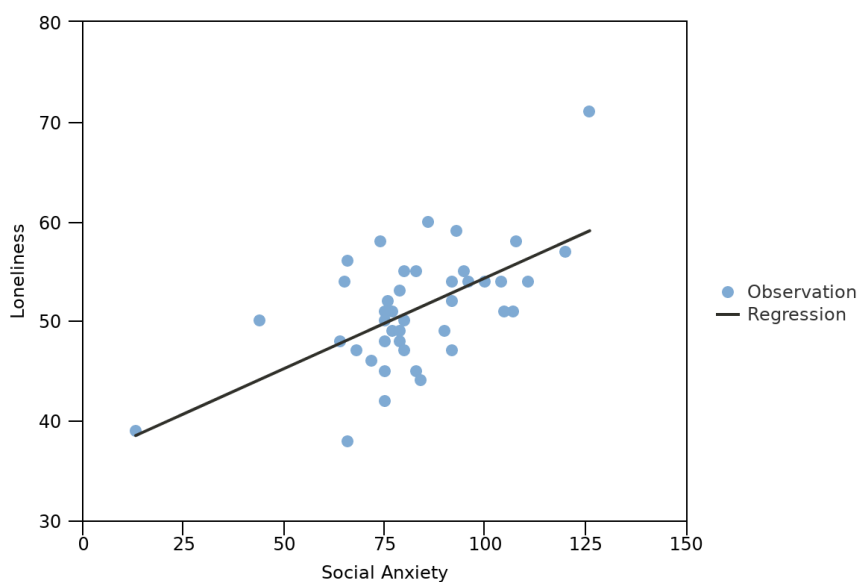




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**Figure 6**

*Scatterplot of social anxiety and loneliness filtered by friendship quality for those scoring in the bottom third of friendship quality*



Cronbach's alpha analyses were run to assess the internal consistency of the measures. The items for LSAS-SR avoidance subscale had a Cronbach's alpha coefficient of  $\alpha = .94$ , indicating excellent reliability. The items for LSAS-SR fear subscale had a Cronbach's alpha coefficient of  $\alpha = .93$ , indicating excellent reliability. The items for MFQ-RA positive feelings subscale had a Cronbach's alpha coefficient of  $\alpha = .91$ , indicating excellent reliability. The items for MFQ-RA satisfaction subscale had a Cronbach's alpha coefficient of  $\alpha = .82$ , indicating good reliability. The items for MFQ-RA evaluation subscale had a Cronbach's alpha coefficient of  $\alpha = .81$ , indicating good reliability. The items for UCLALS-R had a Cronbach's alpha coefficient of  $\alpha = .82$ , indicating good reliability.

### Discussion

The results supported the hypothesis that social anxiety and loneliness would have a positive correlation. However, the results did not support the hypothesis that the positive

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correlation between social anxiety and loneliness would be significantly moderated by the variable of quality friendships. The positive correlation was not statistically significantly stronger with lower-quality friendships and weaker with higher-quality friendships.

The information provided by this study can be important to understand when considering other established research on social anxiety, friendship quality, and loneliness. The present study found a negative association between friendship quality and loneliness and a positive association between social anxiety and friendship quality. The positive association between social anxiety and friendship quality conflicts with research that has found a negative association between social anxiety with friendship quality. Previous research suggested that those who struggle with social anxiety may be more tolerant of lower-quality friends than their less anxious counterparts (Piccirillo et al., 2021). However, the relationship may be different in the college population due to the increased accessibility of same-aged peers in college and may allow for an increased selectiveness of friends (Danneel et al., 2019). Research on the social skills of college students suggests that the actual skill of socializing has an association with lower loneliness and anxiety (Moeller & Seehuus, 2019). Perhaps, the actual skill of socializing is more tied to lower social anxiety than friendship quality. This is in line with research that found an association between highly developed social skills and higher self-worth and research that has associated higher self-worth and lower social anxiety (DiTommaso et al., 2003; Lyyra et al., 2021). The results of a previous study examined the associations between shyness, friendship quality, and loneliness and indicated a negative association between shyness and friendship quality (Tian et al., 2019). The positive association of social anxiety and friendship quality in this study highlights the distinction between the pathology of social anxiety and the personality trait of shyness (Wong & Rapee, 2015). Lastly, while the moderational relationship of friendship quality on social anxiety

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and loneliness has been demonstrated among middle school children, the results of this study indicated no moderation in the college population (Erath et al., 2010). Middle school children may rely on friends in a different manner than college students.

The clinical implications of this study can help in the efforts to manage social anxiety and loneliness. The prevalence of social anxiety and loneliness in college creates an added stressor during a challenging period of life. Social anxiety was positively correlated with loneliness in the sample of this study. This correlation highlights the importance of targeting these issues in therapy. Loneliness was conceptualized as a construct of intimate, relational, and collective loneliness (Hawley, Gu, Luo, & Cacioppo, 2012). Perhaps the high-quality friendships analyzed in this study were not enough of a protective factor for all three forms of loneliness. This highlights the importance of alleviating the three characteristics of loneliness in therapy.

The study had several limitations. First, the study was correlational, limiting its ability to assess the causal paths of these relationships (Musci & Stewart, 2019). Therefore, only the associations and moderations between variables were examined. Additionally, the research was conducted using a correlational design because randomizing the variables of social anxiety, friendship quality, and loneliness is unfeasible. Another limitation of this study was the order in which the surveys were presented to the participants. Research has found that participants who fill out online surveys are prone to response order effects (Malhotra, 2008). For example, participants were asked about their friends before being asked about the loneliness they experienced. The order of questions could have primed participants to feel less lonely or lonelier if they had been reminded of a specific friend or a lack of friends. Furthermore, the study collected data through self-report measures. Self-report measures can result in responses that are less objective than other forms of data collection because participants may interpret questions

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distinctly from other participants (Sandvik et al., 2009). Additionally, the analysis of multicollinearity suggested that the variance inflation factors between predictors were beyond the standard. Multicollinearity can make variables in a regression analysis appear statistically insignificant when they would otherwise be significant. This occurs due to variables being so correlated that the standard error becomes overinflated (Daoud, 2017). Therefore, the result of no statistical significance in the moderation of friendship quality may be due to the multicollinearity of the variables.

The generalizability of the results may be limited because of the homogeneity of the participants who responded to the survey through the Amazon Mechanical Turk participant gathering system. Samples from Amazon Mechanical Turk have been shown to be representative of the population when looking at race and ethnicity. However, the results of this study did not find a representative sample of the United States breakdown of race and ethnicity (Levay, Freese, & Druckman 2016). Out of the 132 respondents, one identified as Black or African American, one identified as Asian, six identified as Native American or Alaska Native, and 124 identified as white. Furthermore, only 11 identified as Hispanic/Latino/a. Social anxiety is more common in East Asian societies and less common in Hispanic/Latino/a groups (Schreier et al., 2010). East Asian countries more frequently possess a stigma about relying on social relationships to alleviate loneliness, while Hispanic/Latino/a groups encourage reliance on friends (Heu, Van Zomeren, & Hansen, 2020). The stigma against relying on social relationships in East Asian countries may result in no moderation of friendship quality because college students may resist using friends for support against social anxiety. Conversely, Hispanic/Latino/a college students, who have been encouraged to lean on friendships for support, may find a moderation of friendship quality.

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Future studies can expand the parameters and examining different factors. This study focused on the relationship of close friends, but future research could attempt to analyze other relationships such as romantic relationships and caregiver relationships to isolate the impact of intimate loneliness in the conceptualization of loneliness proposed by Hawkley, Gu, Luo, & Cacioppo (2012). Intimate connection in college is a central concern for college students and committed relationships have been shown to be a protective factor against loneliness (Diehl et al., 2018). The present study did not account for multiple high-quality friendships. Multiple high-quality friendships may have a moderation that is distinct from the moderation seen with a single high-quality friendship due to the increased sense of belonging and support in social settings. Multiple friendships may also reduce college students' relational and collective loneliness (Hawkley, Gu, Luo, & Cacioppo, 2012). Future research can measure the moderation of these variables in cultures, races, and ethnicities distinct from those in the present study. Groups that encourage reliance on peers for support seem to experience lower rates of loneliness, and groups that discourage seeking support from peers seem to have higher rates of loneliness (Heu, Van Zomeren, & Hansen, 2020; Surkalim et al., 2022). Lastly, participants were also not asked if their friends were in proximity or if they attended the same college. Proximity of friends could impact the relevance of friendship quality in the relationship between social anxiety and loneliness. Friends who live closer together report higher quality friendships and more frequent communication (Preciado et al., 2011).

This study supported the hypothesis of a positive association between social anxiety and loneliness. The results did not find the hypothesized moderation of friendship quality. However, friendship and loneliness may be so closely associated that a multicollinearity may make the factors appear insignificant. Furthermore, the results are limited by the correlational design and

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possible order effects. Future research can account for these limitations and expand the design to assess multiple friendships, romantic relationships, proximity, and varying cultures, races, and ethnicities. While a significant moderation of social anxiety and loneliness by friendship quality was not observed in this study, further research in this area will hopefully provide answers to help combat the negative associations of social anxiety and loneliness.

## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

## Appendix A

**Sociodemographic Questionnaire:**

Please indicate your age: \_\_\_\_\_

Please indicate your gender

- Male
- Female
- Non-binary / third gender
- Other

Are you Hispanic/Latino?

- Yes
- No
- Other

What is your race?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander
- Other

What is your marital status?

- Single
- Married
- Divorced
- Widowed
- Other

What is your current estimated socioeconomic status?

- Under \$50,000 a year
- Between \$50,000 to \$150,000 a year
- Over \$150,000 a year

Please indicate the highest level of education achieved by Parent 1:

- Some High School
- High School Diploma
- Some College
- BA/BS
- Some Graduate School
- MA/MS/Ph.D./MD
- Other

Please indicate the highest level of education achieved by Parent 2:

- Some High School
- High School Diploma
- Some College
- BA/BS

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- Some Graduate School
- MA/MS/Ph.D.
- Other

Are you employed?

- No
- Yes

Do you have a best friend?

- No
- Yes

How many close friends do you have?

How lonely do you feel?

Not lonely at all	1	2	3	4	5	6	Extremely lonely	7
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How lonely do you feel?

How socially anxious do you become when interacting with others?

Not lonely at all	1	2	3	4	5	6	Extremely lonely	7
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How socially anxious do  
you become when  
interacting with others?

What is your current living situation?

- Living at home/with a relative
- Living in a dorm on campus alone
- Living in a dorm on campus with a roommate(s)
- Living alone off campus
- Living with roommate(s) off campus
- Other



## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

**Appendix B**

**Liebowitz Social Anxiety Scale (LSAS-SR)** This measure assesses the way that social phobia plays a role in your life across a variety of situations. Read each situation carefully and answer two questions about it; the first question asks how anxious or fearful you feel in the situation; the second question asks how often you avoid it. If you come across a situation that you ordinarily do not experience, we ask that you imagine “what if you were faced with that situation”, and then rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it (using the 0 to 3 scales below). Please base your ratings on the way that situations have affected you in the last week (or other agreed time period).

	Fear				Avoidance			
	None	Mild	Moderate	Severe	Never (0%)	Occasionally (1-33%)	Often (34-66%)	Usually (67-100%)
1. Telephoning in public.								
2. Participating in small groups.								
3. Eating in public places.								
4. Drinking with others in public places.								
5. Talking to people in authority.								
6. Acting, performing or giving a talk in front of an audience.								
7. Going to a party.								
8. Working while being observed.								
9. Writing while being observed.								
10. Calling someone you don't know very well.								
11. Talking with people you don't know very well.								
12. Meeting strangers.								
13. Urinating in a public bathroom.								
14. Entering a room when others are already seated.								
15. Being the center of attention.								
16. Speaking up at a meeting.								
17. Taking a test.								

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18. Expressing a disagreement or disapproval to people you don't know very well.								
19. Looking at people you don't know very well in the eyes.								
20. Giving a report to a group.								
21. Trying to pick up someone.								
22. Returning goods to a store.								
23. Giving a party.								
24. Resisting a high-pressure salesperson.								

## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

## Appendix C

## McGill Friendship Questionnaire Respondent's Affection (MFQ-RA)

Instructions:

Please insert your closest plutonic (non-romantic) friendship into the blank and score these statements from -4 "Very Much Disagree" to +4 "Very Much Agree."

	Very Much Disagree (-4)	Very Much Agree (4)
1. I am happy with my friendship with ____	-4	-3 -2 -1 0 1 2 3 4
2. I care about ____	-4	-3 -2 -1 0 1 2 3 4
3. I like ____ a lot	-4	-3 -2 -1 0 1 2 3 4
4. I feel my friendship with ____ is a great one	-4	-3 -2 -1 0 1 2 3 4
5. I am satisfied with my friendship with ____	-4	-3 -2 -1 0 1 2 3 4
6. I think ____ is nice	-4	-3 -2 -1 0 1 2 3 4
7. I want to stay friends for a long time	-4	-3 -2 -1 0 1 2 3 4
8. I prefer ____ over most people I know	-4	-3 -2 -1 0 1 2 3 4
9. I feel close to ____	-4	-3 -2 -1 0 1 2 3 4
10. I think my friendship with ____ is strong	-4	-3 -2 -1 0 1 2 3 4
11. I think ____ is a good person	-4	-3 -2 -1 0 1 2 3 4
12. I am glad that ____ is my friend	-4	-3 -2 -1 0 1 2 3 4
13. I hope ____ and I will stay friends	-4	-3 -2 -1 0 1 2 3 4
14. I would miss ____ if he/she left	-4	-3 -2 -1 0 1 2 3 4
15. I think ____ is a likable person	-4	-3 -2 -1 0 1 2 3 4
16. I enjoy having ____ as a friend	-4	-3 -2 -1 0 1 2 3 4

## POTENTIAL MODERATION EFFECTS OF FRIENDSHIP QUALITY

## Appendix C

## UCLA LONELINESS SCALE-REVISED (UCLALS-R)

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

**Statement Never Rarely Sometimes Often**

1. I feel in tune with the people around me	1	2	3	4
2. I lack companionship	1	2	3	4
3. There is no one I can turn to	1	2	3	4
4. I do not feel alone	1	2	3	4
5. I feel part of a group of friends	1	2	3	4
6. I have a lot in common with the people around me	1	2	3	4
7. I am no longer close to anyone	1	2	3	4
8. My interests and ideas are not shared by those around me	1	2	3	4
9. I am an outgoing person	1	2	3	4
10. There are people I feel close to	1	2	3	4
11. I feel left out	1	2	3	4
12. My social relationships are superficial	1	2	3	4
13. No one really knows me well	1	2	3	4
14. I feel isolated from others	1	2	3	4
15. I can find companionship when I want it	1	2	3	4
16. There are people who really understand me	1	2	3	4
17. I am unhappy being so withdrawn	1	2	3	4
18. People are around me but not with me	1	2	3	4
19. There are people I can talk to	1	2	3	4
20. There are people I can turn to	1	2	3	4

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